

New version of patent claims 1 to 11

1. A computer tomograph having:
- a radiation source (41) for emission of X-ray  
5 radiation (40) with a predetermined intensity and a  
predetermined spectrum;
  - a detector unit (2), which comprises a large  
number of detectors (1), for verification of X-ray  
radiation (40), with the individual detectors (1) in  
10 the detector unit (2) being designed to receive  
incident X-ray quanta in the X-ray radiation (40) and  
to detect the intensity of the received X-ray radiation  
(40);
  - a transmission device (43) for transmission of the  
15 information detected by the detectors (1) in the  
detector unit (2) to an evaluation device (44); and
  - an evaluation device (44) which is designed to  
calculate a measurement result from a measurement  
object (42) through which the X-ray radiation (40) has  
20 passed on the basis of the information detected by the  
detectors (1) in the detector unit (2);
- characterized
- in that the individual detectors (1) in the detector  
unit (2) are designed to also detect the quantum energy  
25 of the individual X-ray quanta in the received X-ray  
radiation (40), and in that the evaluation device (44)  
is also designed to calculate the measurement result  
from the measurement object (42) on the basis of the  
information detected by the detectors (1) relating to  
30 the intensity and quantum energy of the individual  
X-ray quanta in the received X-ray radiation (40),  
taking into account the intensity and the spectrum of  
the X-ray radiation (40) emitted from the radiation  
source (41).

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2. The computer tomograph as claimed in claim 1,  
characterized

in that the detectors (1) in the detector unit (2) have  
a large number of parallel-connected comparators (131,  
132, 133), each having a threshold value, and  
in that each comparator (131, 132, 133) has an  
5 associated counter (151, 152, 153), and the comparators  
(131, 132, 133) are designed to increment the  
respectively associated counter (151, 152, 153) by one  
unit when the quantum energy of an X-ray quantum in the  
received X-ray radiation (40) exceeds the threshold  
10 value of the respective comparator (131, 132, 133).

3. The computer tomograph as claimed in claim 2,  
characterized  
in that the threshold values of the comparators (131,  
15 132, 133) are freely variable.

4. The computer tomograph as claimed in claim 2 or 3,  
characterized  
in that the detectors (1) in the detector unit (2) have  
20 a large number of pulse logic devices (141, 142, 143),  
with one pulse logic device (141, 142, 143) in each  
case being connected downstream from the respective  
comparators (131, 132, 133) and upstream of the  
respective counters (151, 152, 153), and the pulse  
25 logic devices (141, 142, 143) providing time  
normalization of the output signals from the  
comparators (131, 132, 133).

5. The computer tomograph as claimed in one of the  
30 preceding claims,  
characterized  
in that the detectors (1) in the detector unit (2) have  
a receiving area (3) for the X-ray radiation (40),  
which receiving area (3) is formed from gadolinium-  
35 oxysulfide ceramic, bismuth germanium oxide or lutetium  
oxyorthosilicate.

6. The computer tomograph as claimed in one of claims  
1 to 4,  
characterized  
in that the detectors (1) in the detector unit (2) have  
5 a direct-conversion receiving area (3) for the X-ray  
radiation (40),

which receiving area (3) is formed from cadmium zinc telluride or cadmium telluride.

7. A method for verification of X-ray radiation by means of a computer tomograph which has a detector unit (2) comprising a large number of detectors (1), having the following steps:

- detection of the intensity of the X-ray radiation (40) received by means of a detector (1) in the detector unit (2);
- transmission of the information obtained by means of the detectors (1) to an evaluation device (44); and
- calculation of a measurement result from a measurement object (42) through which the X-ray radiation (40) has passed, by means of the evaluation device (44) on the basis of the information detected by the detectors (1);

characterized

in that the quantum energy in the individual X-ray quanta in the X-ray radiation (40) received by means of one detector (1) in the detector unit (2) is detected, and

in that the measurement result from the measurement object (42) is calculated by means of the evaluation device (44) on the basis of the information detected by the detectors (1) relating to the intensity and quantum energy of the individual X-ray quanta in the received X-ray radiation (40), taking into account the intensity and the spectrum of the X-ray radiation (40) emitted from a radiation source (41).

8. The method for verification of radiation as claimed in claim 7, characterized

in that the detection of the X-ray quanta which are received by means of the detector (1) in the detector unit (2) comprises the following steps:

- detection of a signal which is produced in the  
5 detector (1) as a consequence of a received X-ray quantum, whose signal level

is proportional to the quantum energy in the received X-ray quantum;

- comparison of the signal level with a large number of predetermined threshold values;

5 - incrementation of a counter (151, 152, 153), which is in each case associated with one range between two adjacent threshold values, by one unit when the signal level of the signal is in the range between the two adjacent threshold values.

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9. The method for verification of radiation as claimed in claim 7, characterized

15 in that the detection of the X-ray quanta which are received by means of the detector (1) in the detector unit (4) comprises the following steps:

- detection of a signal which is produced in the detector (1) as a consequence of a received X-ray quantum, whose signal level is proportional to the quantum energy in the received X-ray quantum;

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- comparison of the signal level with a large number of predetermined threshold values;

25 - incrementation of counters (151, 152, 153), which are each associated with one threshold value, by one unit when the signal level of the signal exceeds the respective threshold value.

10. The method for verification of radiation as claimed in claim 8 or 9,

30 characterized

in that a signal which is produced in the detector (1) as a consequence of a received X-ray quantum is rejected if the determined signal level of the signal is lower than a lowest threshold value.

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11. The method for verification of radiation as  
claimed in claim 8, 9 or 10,  
characterized

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in that the threshold values are freely variable.

**AMENDED SHEET**